

Docket No.: ABK-002.02

INTERNET ORGANIZER

CLAIM OF PRIORITY

This application is a continuation application of U.S.S.N. 09/789,683, filed February 21, 2001, which claims priority to U.S. Provisional Application 60/184,000, entitled "Search Engine having a Two Stage Artificial Memory", filed on February 22, 2000, naming Sherwin Han as inventor, the contents of which are herein incorporated by reference in their entirety, and this application is also a continuation in part of U.S.S.N. 09/541,247 entitled "Knowledge Acquisition and Retrieval Apparatus and Method", filed on April 3, 2000, naming Sherwin Han as inventor, the contents of which are also herein incorporated by reference in their entirety and claim priority to U.S. Provisional Application 60/127,764, entitled "Two Stage Artificial Memory Processes," naming Sherwin Han as inventor and filed on April 2, 1999.

BACKGROUND OF THE INVENTION

(1) Field of the Invention

The present invention relates generally to information storage and retrieval, and more particularly to methods and systems for organizing information for efficient retrieval.

(2) Description of the Prior Art

The internet's popularity continues to increase at an extremely rapid pace, with increasing numbers of business opportunities arising as a result of the network. There is a common belief that an internet presence in the form of a website is essential to continued commercial success, even though the internet presence is merely an aspect of the total business plan.

As important as the internet presence may be perceived, however, some widely anticipated internet opportunities have not been realized and the result is often a dismemberment of the resources and effort originally compiled to finance and/or operate the business venture.

It is one opinion that the rapid growth of the internet caused many businesses to prioritize time in attaining an internet presence at the expense of basic human factors issues in designing their websites. As a result, many websites are difficult to navigate, and when an internet user finds a website wherein the user believes the website includes the information the user is seeking, it is often difficult for the user to find

1 the information within the myriad of sub-pages, advertisements,
2 and other content that can appear as part of the website. It is
3 believed that this general lack of internet information, even at
4 the web page level, is a reason for the failure of some internet
5 practices. The tremendous amount of information available
6 through the internet cannot be fully exploited or realized with
7 the current, unorthodox, and non-uniform information organization
8 structures that prevent existing search engines and other
9 localized searching techniques from providing valuable search
10 results.

11 It should be recognized that the heart of the internet,
12 computers, do not store, process, or retrieve information in the
13 same manner as the human brain. In nearly all instances, the
14 human knowledge processing system is more efficient than existing
15 computer processing algorithms. Research and concepts including
16 neural networks, fuzzy logic, etc., attempt to simulate the human
17 brain's vast capability to learn and associate in complex
18 manners. Prior art systems disclose rule-based solutions as
19 opposed to structure-based solutions that are constructed in the
20 human brain.

21 The human brain's associative capabilities are not limited
22 like a computer to words or pure binary data stimuli. The human
23 brain makes associations based upon visual data, auditory data,
24 sensory data such as touch, and motion data, all of which emanate

1 from the physical world. The human brain therefore stores,
2 associates, and can recall multiple data species with a single
3 object. For example, the brain may associate "banana" with the
4 category of fruit, the spoken word banana, the image of a ripe
5 yellow banana, the image of a non-ripe green banana, the smell of
6 a banana, the texture of a banana peel, etc.

7 There is not currently a efficient mechanism for applying
8 human-like storage and data retrieval mechanisms to the
9 information on the internet.

10 What is needed is a system and method that simulates the
11 human brain's knowledge acquisition and retrieval mechanisms to
12 provide increased efficiency data retrieval for large amounts of
13 data such as found on the internet.

14 15 SUMMARY OF THE INVENTION

16 The present invention provides an apparatus and method to
17 organize, transform, and associate information between two
18 conceptually graduated memory stages that can form the basis for
19 a knowledge database. In an embodiment, the conceptually
20 graduated memory stages can be utilized to make associations
21 between a search term, and other descriptor terms that can
22 describe data such as a document or web document. In an
23 embodiment, the web document can be a web page that can be

1 further associated with a Uniform Resource Location (URL) and an
2 Internet Protocol (IP) address.

3 In one embodiment, a registrant can register a web page by
4 providing a URL with a list of descriptors. The descriptors can
5 be associated with the respective URLs using traditional database
6 techniques to form a URL database. Alternately and optionally, a
7 bot or robot can determine URLs related to the registered URL,
8 and similarly identify descriptors related to the associated
9 URLs. In an embodiment, the related descriptors can be metadata,
10 although the invention is not limited to such acquisition of
11 descriptor data. The associated URLs and related descriptors can
12 be added to the URL database. The URL database can be separate
13 from or related to the knowledge database.

14 In an embodiment, a search term can be presented to the
15 methods and systems such that associated keywords are identified
16 based on the search term by accessing the knowledge database.
17 Similarly, a list of URLs can be identified wherein the
18 identified URLs associate with a descriptor that matches, exactly
19 or in partial form, the search term. Subcategories and cross-
20 categories of search terms can be identified and presented to the
21 user whom entered the search term to allow an organized
22 presentation of search results. Search results can include URLs
23 and HTTP links to URLs. Subcategories and cross-categories can
24 be explored by users.

In an embodiment, registrants can access and add data to the knowledge database to present word associations that are otherwise not known or traditional. For example, an association between "apple" and "computer" can be entered, while the association between "apple" and "fruit" is likely already part of the knowledge database. An interface allows registrants to view the current knowledge database records to determine if an addition is necessary.

Other objects and advantages of the present invention will become more obvious hereinafter in the specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the invention and many of the attendant advantages thereto will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings, wherein like reference numerals refer to like parts and wherein:

FIG. 1 diagrammatically presents the basic structural knowledge acquisition and retrieval system;

FIGs. 2A, 2B, and 2C present examples of the reciprocal association algorithm;

FIG. 3 is a sample, reciprocally associated database containing a physical data segment and a conceptual data segment;

FIGs. 4A and 4B diagrammatically present a hierarchical structure as viewed by the recall and categorization retrieval algorithms, respectively;

FIG. 5 displays the retrieval algorithms of the illustrated embodiments and their mathematical representations as described herein;

FIG. 6 depicts the external systems and functionality that may be imported or exported from the knowledge acquisition and retrieval system;

1 FIG. 7 provides a block diagram of an execution module that
2 extracts data from the knowledge acquisition and retrieval
3 system;

4 FIG. 8. illustrates an embodiment of the Internet or Web
5 Organizer that utilizes the two stage memory of the knowledge
6 acquisition and retrieval system of FIGs. 1 through 7;

7 FIG. 9 presents an illustrative graphical user interface
8 (GUI) for the Web Organizer of FIG. 8, wherein the GUI can be
9 implemented as a webpage;

10 FIG. 10 provides an exemplary portion of a URL database
11 according to a system of FIG. 8;

12 FIG. 11 illustrates a system and method according to a
13 system of FIG. 8 for augmenting the FIG. 8 knowledge database;

14 FIGs. 12A and 12B provide illustrative block diagrams
15 demonstrating a URL registration and keyword association process,
16 respectively, for a system according to FIG. 8;

17 FIG. 13 is an exemplary portion of a Knowledge database
18 according to FIG. 8;

19 FIGs. 14A, 14B, and 14C illustrate the concepts of
20 descriptors, subcategories, and cross-categories; and,

21 FIG. 15 presents illustrative search results for a Web
22 Organizer according to FIG. 8.

1 DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

2 To provide an overall understanding of the invention,
3 certain illustrative embodiments will now be described; however,
4 it will be understood by one of ordinary skill in the art that
5 the systems and methods described herein can be adapted and
6 modified to provide systems and methods for other suitable
7 applications and that other additions and modifications can be
8 made to the invention without departing from the scope hereof.

9 FIG. 1 represents one embodiment of the knowledge
10 acquisition and retrieval system **10** that incorporates the
11 principles of the invention. Such a system can be implemented
12 using a digital computer system and information sources that are
13 accessible via a communication network, keyboard, digital camera,
14 microphone, etc. The digital computer system can be any
15 microprocessor-based system including a computer workstation,
16 such as a PC workstation or a SUN workstation, that comprises a
17 program for organizing and controlling the digital computer
18 system to operate as the system according to the invention.
19 Additionally and optionally, the microprocessor-based system can
20 be equipped for processing multimedia data, and can be, for
21 example, a conventional PC computer system with a sound and video
22 card. The computer system can operate as a stand-alone system
23 or as part of a networked computer system. Alternatively, the
24 computer systems can be dedicated devices, such as embedded

1 systems, that can be incorporated into existing hardware devices,
2 such as telephone systems, PBX systems, sound cards, etc.

3 Accordingly, it will be understood by one of ordinary skill in
4 the art that the systems and methods described herein have wide
5 applicability and can be incorporated in many systems, and
6 realized in many forms, all without departing from the scope of
7 the invention.

8 Referring to FIG. 1, the illustrated knowledge acquisition
9 and retrieval system **10** can be described by referring to four
10 basic structural components that are presented merely for
11 explanatory purposes, and are not intended to represent a
12 limitation of the invention herein: An input/acquisition module
13 **12**, a storage/association module **14**, a retrieval module **16**, and
14 an output module **17**. Because in the illustrated system,
15 input/acquisition module **12** and retrieval module **16** components
16 are based on the storage/association module **14** components, the
17 storage/association module **14** shall be described first.

18 The FIG. 1 storage/association module **14** includes an
19 association algorithm **18** and two memory segments designated in
20 FIG. 1 as a physical memory segment **20**, and a conceptual memory
21 segment **22**. The association algorithm interfaces between the
22 input/acquisition module **12** and the two memory segments **20**, **22** to
23 ensure that outputs of the input/acquisition module **12** resolve

1 into reciprocally associated physical and conceptual memory
2 elements.

3 The storage/association module's **14** two memory segments **20**,
4 **22** emulate the human brain storage mechanism. The human brain
5 can be understood to include two memories that shall be referred
6 to herein as representational memory and consciousness memory.
7 Representational information can be understood as information
8 received directly by the senses from the physical world.
9 Alternately, consciousness information can be understood as
10 information not directly received from the senses, but rather
11 generated from representational information and may be viewed as
12 a property of representational information or a shared group of
13 representational information. Consciousness data can be viewed
14 as abstract data, and can be retained at a higher level of
15 categorization than the representational data received from the
16 physical world. For simplicity, the remainder of this
17 specification shall refer to representational data as physical
18 data, and consciousness data as conceptual data.
19 Correspondingly, the FIG. 1 illustration indicates the physical
20 memory segment **20** for storing physical data, and the conceptual
21 memory segment **22** for storing conceptual data.

22 The illustrated association algorithm **18** reciprocally
23 associates physical memory elements to at least one conceptual
24 memory element. Because the illustrated physical and conceptual

1 memory segments **20, 22** are reciprocally associated, they may be
2 constructed from a single memory that is divided into two
3 segments, or two physically separate memory segments. Similarly
4 the reciprocal associations can be established through any
5 linking device including pointers and/or linked lists, but the
6 invention is not so limited. In an embodiment, the memory is
7 constructed upon a database system, such as Microsoft Access,
8 ODBC, or SQL Server. Those with ordinary skill in the art will
9 recognize that the physical and conceptual memory segments can be
10 memories that may be otherwise partitioned physically or
11 logically, without departing from the scope of the invention.

12 In an embodiment, the input/acquisition module **12** can be a
13 multi-modality input system that simulates the human senses.
14 Referring to FIG. 1, the input/acquisition module **12** includes
15 interfaces to accept auditory data **24** including sounds input by a
16 microphone, visual data **26** including graphs and images, language
17 data **28** including written, spoken, scanned, and FAXed text,
18 motion data **30** including positional information from sonar,
19 radar, etc., and sensor data **32** that can be from any electronic
20 measuring device including sonar, radar, temperature sensors,
21 medical devices, etc., although such examples are provided for
22 illustration and not limitation.

23 Each of the illustrated multi-modal input interfaces **24, 26,**
24 **28, 30, 32** provide a mechanism to allow the user to identify that

1 data comprising the physical data, and that data comprising the
2 conceptual data. For example, auditory information can be input
3 through a microphone to record a baby crying. In this example,
4 the sound is the physical data, while "baby crying" is the
5 abstract or conceptual data. A picture of Abraham Lincoln can be
6 scanned through the visual data interface as physical data, with
7 "Abraham Lincoln" associated as the conceptual data. Language
8 data can be input through any interface, for example a graphical
9 user interface (GUI) that prompts for physical and conceptual
10 data pairs, e.g., "George Washington"--"president" can be entered
11 as the physical-conceptual pair. Positional data received from
12 radar is representative of physical data from the motion data
13 interface **30**, while the corresponding conceptual data would be
14 "current position". Similarly, a temperature reading from a
15 thermometer can be introduced through the sensor data interface
16 **32** as physical data, with the associated conceptual data being
17 "temperature".

18 The illustrated association algorithm **18** within the
19 storage/association module **14** can accept the physical-conceptual
20 data pairings from the multi-modal input/acquisition module **12**,
21 transfer the data to the respective physical and conceptual
22 memory segments, **20**, **22**, and form reciprocal associations between
23 the newly entered data elements. A further function of the FIG.

1 1 association algorithm **18** is to identify physical data as
2 auditory, visual, language, motion, or sensory.

3 In an embodiment, to further emulate the human brain, the
4 illustrated physical data memory segment **20** can be further
5 divided into multiple partitions, with partitions corresponding
6 to a respective input mode or data type. As shown by FIG. 1,
7 because there are five different modal inputs (e.g., auditory,
8 visual, language, motion, and sensor), the illustrated physical
9 memory segment **20** maintains five partitions, thereby organizing
10 the information received by each modal input. Alternately, the
11 illustrated system conceptual memory **22** is not partitioned.

12 Referring now to FIG. 2A, there is shown an example of the
13 physical and conceptual memory segments after language data is
14 input through the language data interface. In one embodiment,
15 the language data interface comprises a GUI that prompts a user
16 for physical data and its associated conceptual data. In the
17 example provided by FIG. 2A, "George Washington-President" is
18 entered as the physical-conceptual data pair. From this data
19 pair, the illustrated system "learns" the relationship between
20 the physical and conceptual elements by associating the physical
21 and conceptual data elements as shown by FIG. 2A. For
22 simplicity, FIG. 2A represents only the language partition of the
23 physical data memory **20**.

1 Upon receiving the data pair "George Washington-President",
2 the FIG. 1 association algorithm **18** can establish three
3 reciprocal associations between the physical and conceptual
4 memory segments. In this instance, the language partition of the
5 physical data segment is utilized because the data is from the
6 language data interface. The first association can be
7 established using the rule that every physical data element can
8 be reciprocally associated to a conceptual data element. In FIG.
9 2A, "George Washington" is reciprocally associated **50** to the
10 abstract concept "G". The second reciprocal association can be
11 established by the rule that every conceptual data element can be
12 reciprocally associated to a physical data element. In FIG. 2A,
13 this reciprocal association can be demonstrated by "president"
14 (physical data) reciprocally associating **52** to the abstract
15 concept "P". The third reciprocal association can be established by
16 the data pairing itself, and shown in FIG. 2A as **54**. The
17 physical (language partition) data of "George Washington" is
18 reciprocally associated **54** to the abstract concept of "P",
19 wherein P is shown by **52** to be the abstract concept relating to
20 the physical data of president. In the illustrated system, the
21 three reciprocal connections **50, 52, 54** complete the learning
22 process for the example input.

23 Continuing the example, consider that additional language
24 information is input similarly as "Abraham Lincoln-President".

1 Referring now to FIG. 2B, there is shown the physical and
2 conceptual memory segments **20**, **22** with pre-existing reciprocal
3 associations from FIG. 2A, and new reciprocal associations
4 indicated. The FIG. 1 association algorithm **18** first establishes
5 a reciprocal association **56** between "Abraham Lincoln" in the
6 physical memory segment (language partition) and an abstract
7 concept A in conceptual memory **20**. Secondly, the illustrated
8 association algorithm **18** seeks to establish an association
9 between the conceptual element P and president; however, this
10 relationship has already been learned, and therefore it is not
11 necessary to "learn" this concept again by entering the
12 relationship. Thirdly, a reciprocal association is established
13 between the physical data of "Abraham Lincoln" and the conceptual
14 data P **58**, wherein P is the conceptual element relating to the
15 physical data known as "President".

16 As a third step in the input/acquisition process, consider a
17 visual input comprising an image of Abraham Lincoln. The
18 physical data is the image, while the conceptual data is "Abraham
19 Lincoln." Referring now to FIG. 2C, there is shown pre-existing
20 reciprocal associations from FIG. 2B, with additional reciprocal
21 associations established. The association algorithm **18** can place
22 the image in the visual data partition of physical memory **20**, and
23 establish the reciprocal associations. First, a reciprocal
24 association **60** can be established between the physical data image

1 and a conceptual data element. Secondly, a reciprocal
2 association between the concept "Abraham Lincoln" and a physical
3 data element is sought, and determined to be already established,
4 or learned. Thirdly, the physical data image is reciprocally
5 associated to the abstract concept representing Abraham Lincoln
6 **62.**

7 Although the example provided was limited to language and
8 visual data, as already noted, the invention is not so limited,
9 additionally allowing auditory, motion, and sensor data, with
10 similar partitions of the physical memory segment. Similarly,
11 although the invention is capable of auditory, motion, visual,
12 sensor, and language inputs, it is not necessary to include all
13 input modes to embody the invention. The number of associations
14 created is only limited by the memory segment size (if physical
15 data is partitioned into segments, partition sizes must also be
16 considered.)

17 Referring back to FIG. 1, for discussion purposes, the third
18 major component of the illustrated knowledge acquisition and
19 retrieval system **10** is the retrieval module **16**. The illustrated
20 retrieval module **16** is primarily responsible for emulating the
21 human brain's cognitive capabilities by retrieving data from
22 physical memory and outputting the data to a desired format or
23 medium for the multi-modal output module **17**. Because the
24 physical data can be divided into auditory, visual, language,

1 motion, and sensor partitions, with each partition representative
2 of the data stored therein, the potential system outputs can
3 correspondingly be auditory, visual, language, motion, and sensor
4 data. Auditory data can be output to a speaker, visual and
5 language data may be output to document, screen, GUI, or other
6 computer readable medium, and motion and sensor data can be
7 output to another device, instrument, GUI, document, etc. The
8 output module **17**, similar to the input/acquisition module **12**, can
9 also be multi-modal, and comprises interfaces to the various
10 output devices.

11 The retrieval module **16** comprises a set of algorithms that
12 traverse reciprocal associations between the physical memory
13 segment **20** and the conceptual memory segment **22** according to a
14 designated retrieval method. Because the illustrated knowledge
15 acquisition and retrieval system **10** emulates the human brain, all
16 outputs are extracted from physical memory **20**, whose elements
17 represent the physical world. In the retrieval process, the
18 illustrated conceptual memory **22** is accessed merely to derive
19 associations to physical memory elements.

20 In an embodiment, the retrieval module **16** comprises seven
21 retrieval algorithms that are selectable through a GUI.
22 Depending upon the selected retrieval algorithm, the GUI can
23 prompt the user for inputs. The seven retrieval algorithms can
24 simulate human brain retrieval processes, and may be defined as

deduction **34**, reduction **36**, recall **38**, recognition **40**, imaging **42**, categorization **44**, and reasoning **46**.

Deduction **34** is a retrieval algorithm to extract exclusively from the language partition of physical data memory. Deduction can be defined as the set of conceptual data related to a physical data element, wherein the physical data element is categorized as language data, and the related conceptual data is associated to language data. Referring now to FIG. 3, there is a database representing the language partition of physical data memory **20**, and conceptual data memory **22**, with established reciprocal associations as indicated. A deduction retrieval request for the user-specified physical data element "George Washington" presents the set of conceptual data associated to "George Washington". Using the example database of FIG. 3, a search through physical data memory for all conceptual data associated to "George Washington" provides conceptual data "G" and "P". Once again, the retrieval algorithm cannot generate abstract ideas, but must generate the corresponding physical world equivalents. Since "G" reciprocates to "George Washington", or the input data, it is not provided as an output; however, "P" reciprocates to "President", which comprises physical world data different from the input. The deductive output for "George Washington" is therefore "President". This process is considered a linear retrieval from conceptual data

(consciousness data), wherein the input is physical, language data, and the output is also language data associated with the retrieved conceptual data. Because there is only one input yet potential multiple outputs, this process is hereby defined as a single-input process. This retrieval may be mathematically expressed as $L < C$, where L signifies the input Language data, $<$ indicates a single input producing potentially multiple outputs, and C signifies the retrieved conceptual data.

Recognition retrieval **40** is the same retrieval algorithm as deduction, except whereas deduction is limited to a single, language physical data input, recognition retrieval **40** accepts as input a single, physical data input from any physical data category other than the language type (i.e., auditory, visual, motion, or sensor), and outputs the conceptual data related to the input. Depending upon the input category, this retrieval may be mathematically expressed as $A < C$, $V < C$, $M < C$, $S < C$, where A signifies auditory data input, V signifies visual data input, M signifies motion data input, and S signifies sensor data input. Once again, as in deduction, there can be multiple outputs for recognition.

Reduction retrieval **36**, like deduction retrieval **34**, can be limited to retrieving physical data from the language partition.

Reduction retrieval generates the set of (language) physical data that is related to a specified conceptual idea (input).

1 Referring again to the sample database of FIG. 3, if "Leader" is
2 presented as the conceptual element, "Leader" is conceptually
3 represented as "L". A search through conceptual memory for
4 physical data associated to "L" (other than the input, "Leader")
5 provides "President", "Monarch", and "Dictator", which include
6 the output of a reduction inquiry with "Leader" as the input. In
7 reduction, for the illustrated systems, there is exactly one
8 input, yet potential multiple outputs. Mathematically, this may
9 be represented as $C < L$, where C signifies the single conceptual
10 data input, < signifies a single input and potential multiple
11 outputs, and L signifies the Language data output(s).

12 Recall retrieval **38** can be an algorithm performing the same
13 procedure as reduction, except recall requires two or more
14 conceptual data inputs. Recall can provide as output those
15 physical data elements identified as language data, that
16 represent the physical data common to the two or more conceptual
17 data inputs. Referring to the sample database of FIG. 3,
18 consider two inputs of "Leader" and "Monarch" as the conceptual
19 elements, corresponding to "L" and "M" respectively. Referring
20 now to FIG. 4A, there is shown the tree diagram representing the
21 recall retrieval algorithm. A search through conceptual data for
22 "L" provides reciprocal associations with "President", "Monarch",
23 and "Dictator", otherwise conceptually represented as "P", "M",
24 and "D", respectively. Because the connection containing "L" and

1 "M" is the desired connection and it is already established, it
2 is now only necessary to pursue the reciprocal associations of
3 the common branch **70**. A search through the FIG. 3 database
4 conceptual data for the conceptual data "M" provides a single
5 reciprocal association to "Queen Elizabeth". A similar search in
6 conceptual data for "Q", the conceptual equivalent of "Queen
7 Elizabeth", does not provide any reciprocal associations, thereby
8 ending the recall retrieval algorithm. The single recall
9 algorithm output for this example is therefore "Queen Elizabeth";
10 however, if multiple monarchs were listed, the recall retrieval
11 would have produced multiple outputs. This recall function
12 operates in the same manner as the human brain to recall
13 information having specified common properties. Mathematically,
14 recall retrieval may be expressed as $C > L$, where C signifies
15 conceptual data, > indicates multiple inputs with potential
16 multiple outputs, and L signifies language, physical data. An
17 alternate mathematical representation for recall with two inputs
18 may be $C_1 + C_2 > L_1 \wedge L_2$, where C_1 is the first conceptual input,
19 C_2 is the second conceptual input, L_1 is the language physical
20 data associated with C_1 , L_2 is the language physical data
21 associated with C_2 , and \wedge denotes intersection.

22 Imaging retrieval **42** is the same retrieval process as recall
23 retrieval **36**, however whereas recall **36** can be limited to
24 retrieving from the language partition of the physical memory

1 segment, imaging 42 can be limited to retrieving from the
2 auditory, visual, motion, and sensor partitions of physical
3 memory 20. Imaging can be mathematically represented as $C > A$,
4 $C > V$, $C > M$, and $C > S$, where C signifies the multiple conceptual data
5 inputs, > represents multiple inputs, and A signifies potential
6 multiple auditory outputs, V signifies potential multiple visual
7 outputs, M signifies potential multiple motion outputs, and S
8 signifies potential multiple sensor outputs. Alternately,
9 imaging for two inputs can be represented as $C_1 + C_2 > R_1 \wedge R_2$,
10 where C_1 and C_2 are the conceptual inputs, R_1 and R_2 are the
11 respective, non-language representational (physical) data, and \wedge
12 denotes intersection.

13 Categorization retrieval 44 can require two or more inputs
14 representing physical data inputs. Categorization retrieval
15 produces those conceptual data elements that the two physical
16 data inputs share. As an example using the database from FIG. 3,
17 consider inputs of "Queen Elizabeth" and "George Washington".
18 Conceptually, categorization produces a tree for each physical
19 data input, and produces as output the common elements, or
20 intersection, of the respective trees. FIG. 4B illustrates the
21 trees produced for the respective physical data inputs. Using
22 the FIG. 3 sample database, a search for "Queen Elizabeth" in
23 physical data presents reciprocal associations to M conceptually.
24 M is physically represented as Monarch, and a search for

1 "Monarch" in physical data produces reciprocal associations to
2 conceptual data L. Continuing, a search of physical data for
3 "Leader" (corresponding to L) provides reciprocal associations
4 with H, or "Human Being". A search of "Human Being" in physical
5 data does not reciprocally associate with any other concept,
6 thereby ending the tree **80**. A similarly constructed tree can be
7 produced by performing the same analysis using the FIG. 3 sample
8 database, but beginning with "George Washington" **82**, and
9 repeatedly searching the physical data memory for reciprocal
10 associations. The categorization output is the intersection of
11 the trees for "Queen Elizabeth" **80** and "George Washington" **82**,
12 thereby producing an output of "Leader" and "Human Being". Much
13 like the human mind, categorization retrieval generates the
14 common elements, i.e., Queen Elizabeth and George Washington both
15 were leaders and human beings. Mathematically, categorization
16 may be represented as $R > C$, where R signifies representational
17 data (i.e., any physical data), > represents multiple inputs and
18 potential multiple outputs, and C signifies the potential,
19 multiple conceptual data outputs. An alternate mathematical
20 representation for two inputs is $R1 + R2 > C1 \wedge C2$, where R1 and
21 R2 are the physical (representational) data inputs, C1 and C2 are
22 the corresponding conceptual data, and \wedge denotes intersection.

23 Referring back to FIG. 1, reasoning retrieval **46** can accept
24 two or more elements from physical data as input, and generate an

1 output equivalent to those conceptual data elements that connect
2 the reasoning inputs through deduction. For example, referring
3 to the sample FIG. 3 database, consider as input "George
4 Washington" and "Leader". "George Washington" connects
5 conceptually to "P", or "President", and "President" connects to
6 "L", or "Leader". The reasoning retrieval output for the present
7 example is therefore "President" as the conceptual ("P")
8 connection between the two terms. Again, the human mind, when
9 presented with "George Washington" and "Leader", would reason
10 that George Washington was a leader because he was a President.
11 Mathematically, reasoning may be represented as $R1 \text{ --- } R2 < C1 \wedge$
12 $Cn \wedge C2$, where $R1$ and $R2$ are the physical (representational) data
13 input pair, $C1$ and $C2$ are the respective conceptual data
14 elements, Cn represents all conceptual data elements connecting
15 $C1$ and $C2$, and \wedge denotes intersection.

16 Referring now to FIG. 5, there is shown a summary of the
17 seven retrieval algorithms with their corresponding mathematical
18 representations as provided herein.

19 Referring now to FIG. 6, there is shown the knowledge
20 acquisition and retrieval system **10** to illustrate additional
21 capabilities regarding interaction with other systems. Although
22 the present invention provides multi-modality input and output
23 systems for auditory, language, visual, motion, and sensor data,

1 the system **10** also allows mechanisms for data export, data
2 import, and data adoption.

3 In the illustrated systems, data export is a function
4 whereby the physical and conceptual memories, and the reciprocal
5 associations established therein, are written in a formatted
6 manner to an external device **92**. Such external device may be a
7 data file, other computer system connected through a network, or
8 any computer readable medium. These formatted data associations
9 **92** can then be imported by another system practicing the
10 invention presented herein. The import of the formatted database
11 **94** does not require any conversion as the formatted database
12 comprises the required reciprocal associations. Data import from
13 a formatted database can be a direct operation from the external
14 database, to the physical and conceptual memory segments.

15 Alternately, generic databases **96** can provide data for input
16 to the reciprocally associated physical and conceptual memories;
17 however, because traditional databases do not provide the
18 reciprocal associations required by the invention herein, the
19 generic data must be reformatted to provide reciprocal
20 association for entry into the physical and conceptual memory
21 segments. This process can be described herein as adoption. In
22 one embodiment, the knowledge acquisition and retrieval system **10**
23 provides a GUI that allows selection of specific, generic
24 databases that may be adapted to the reciprocal memory. Examples

1 of such specific databases that can be adopted include SQL, ODBC,
2 dBase, and Oracle, but the invention herein is not so limited,
3 and the adoption algorithm may be adapted to include any generic
4 database. Each generic database for adoption may require a
5 different conversion algorithm.

6 In one embodiment, the knowledge acquisition and retrieval
7 system GUI provides an interface to allow selection of data
8 export, data import, and data adoption.

9 Referring again to FIG. 6, there is shown the execution
10 module **98** that can receive or extract data from the knowledge
11 acquisition and retrieval system **10**. Referring now to FIG. 7,
12 the illustrated execution module **10** extracts physical and
13 conceptual data information with corresponding reciprocal
14 associations, to form new memory associations. The execution
15 module **98** typically extracts only a data subset from the
16 knowledge acquisition and retrieval system **10** for the specific
17 purpose of deriving relationships corresponding to executable
18 functions such as walking, jumping, throwing, catching, etc. The
19 execution module **98** can extract information directly from the
20 storage/association module **14** (i.e., physical and conceptual
21 memory directly), or the execution module **98** can extract data
22 indirectly through the retrieval module **16** and its retrieval
23 algorithms. The illustrated execution module **98** therefore
24 includes an interface to extract data subsets from the physical

1 and conceptual memory segments, a dual memory configuration to
2 store the extracted data and maintain the reciprocal
3 associations, an association or learning algorithm to further
4 associate the extracted concepts and relate them to an activity,
5 and an output interface to output the activity data to the
6 desired output device or sensor.

7 Referring now to Figure 8, there is an illustrative diagram
8 **100** of a system utilizing a reciprocal two stage memory **102** as
9 described herein and in which another example is illustrated in
10 Figure 3. In the Figure 8 representative system, the reciprocal
11 memory can otherwise be referred to as a Knowledge Database **102**.

12 The Figure 8 system also includes a URL database **104** that
13 associates URLs to keywords. The URL database **104** and Knowledge
14 Database **102** can be any memory device that can have a single
15 memory segment or partition (logical or physical), multiple
16 memory segments having single or multiple memory partitions
17 (logical or physical), and/or can be implemented using any one of
18 well-known database programs including SQL, MySQL, Oracle, etc.
19 Those with ordinary skill in the art will recognize that although
20 the Knowledge Database **102** and URL Database **104** are illustrated
21 as separate databases, the databases **102**, **104** can be combined or
22 otherwise divided without departing from the scope of the
23 invention. For the purposes of the disclosure herein, references

1 to website(s) and webpage(s) shall be understood to be a
2 reference to a URL(s).

3 The Figure 8 Knowledge and URL Databases **102, 104** can be
4 implemented as part of a Web Organizer **106** that can organize
5 information on a network such as the internet. The illustrated
6 Web Organizer **106** includes a Graphical User Interface (GUI) **108**
7 that further can be described as having functionality that
8 includes a Web Page Registration module **110**, a Knowledge Database
9 Addition module **112**, and a Search Engine module **114**. Those with
10 ordinary skill in the art will recognize that the representative
11 system of Figure 8 is merely illustrative and intended for
12 explanatory purposes, and the components displayed therein may be
13 combined or otherwise divided without departing from the scope of
14 the invention.

15 For the purposes of discussion with respect to systems and
16 methods according to Figure 8, it can be understood that the
17 internet is a network of computers that can be divided
18 generically into clients and servers, where any one of well-known
19 internet browsers executing on a client, can execute a command to
20 retrieve requested information, including for example, a web
21 document, web page, content information, etc., from a specified
22 internet address that corresponds to server. A server can be
23 understood to include a processor, a memory (e.g. RAM), a bus to
24 couple the processor and the memory, a mass storage device (e.g.

1 a magnetic or optical disk) coupled to the processor and the
2 memory through an I/O controller, and a network interface coupled
3 to the processor and the memory. The servers may further include
4 one or more mass storage devices such as a disk farm or a
5 redundant array of independent disks ("RAID") system for
6 additional storage and data integrity. Read-only devices, such
7 as compact disk drives and digital versatile disk drives, may
8 also be connected to the servers. Servers can be understood to
9 be, for example, personal computers (PCs), SUN workstations,
10 handheld, palm, laptop, cellular telephones, or other
11 microprocessor controlled devices for performing the operations
12 and functions as described herein and attributed to servers.
13 Servers can be connected via networks for more efficient
14 processing of client traffic. Servers in stand-alone or network
15 configurations can operate together or independently for
16 different functions, wherein a server can be designated a
17 database server, an application server, a web server, etc. As
18 used herein, the term "server" is intended to refer to any of the
19 above-described servers that further includes instructions for
20 causing the server processor to perform the functions designated
21 and attributed to the servers herein. For the purposes of the
22 discussion herein, the client as discusses previously, can also
23 be a server.

1 As is well-known in the art, information requested of the
2 server can be displayed or otherwise presented to a user of the
3 client via a viewing device such as a display, screen, etc., that
4 is otherwise integrated with the client. In an internet
5 embodiment, user requests for information can be executed via the
6 browser on the client wherein the browser provides an interface
7 for the user to designate a Uniform Resource Location (URL) and
8 cause the browser to execute an Hyper-Text Transfer Protocol
9 (HTTP) request to the server, wherein in the illustrated
10 embodiment, the server corresponds to the URL designated by the
11 user. The server responds to the http request by transmitting
12 the requested information to the client. Those with ordinary
13 skill in the art will recognize that the retrieved information
14 can be in the form of an HTTP object that includes plain text
15 (ASCII) conforming to the HyperText Markup Language ("HTML"),
16 Dynamic HyperText Markup Language ("DHTML"), Extensible Markup
17 Language ("XML"), the Extensible Hypertext Markup Language
18 ("XHML"), Standard Generalized Markup Language ("SGML"), etc.
19 Additionally, the retrieved information can include hyperlinks to
20 other Web documents, and the server can execute programs
21 associated with the retrieved information using programming
22 languages such as Perl, C, C++, or Java. The server can also
23 utilize scripting languages such as ColdFusion from Allaire,
24 Inc., or PHP, to perform "back-end" functions such as order

1 processing, database management, and content searching.
2 Retrieved information in the form of a web document may also
3 include references to small client-side applications, or applets,
4 that are transferred from the server to the client with the web
5 document and executed locally by the client, wherein Java is one
6 popular exemplary applet programming language. The text within a
7 web document may further include non-displayed scripts that are
8 executed by an appropriately enabled browser using a scripting
9 language such as JavaScript or Visual Basic Script. Browsers can
10 further be enhanced with a variety of helper applications to
11 interpret various media including still image formats such as
12 JPEG and GIF, document formats such as PS and PDF, motion picture
13 formats such as AVI and MPEG, and sound formats such as MP3 and
14 MIDI. These media formats, with an increasing variety of
15 proprietary media formats, can enrich a user's interactive and
16 audio-visual experience as a web document is presented through
17 the browser at the client.

18 Those with ordinary skill in the art will recognize that
19 application logic executed by a first server can issue a HTTP
20 request to a second server, wherein the application logic can be
21 executed on the second server to produce, for example, XML
22 results. In this example embodiment, the XML results from the
23 second server can be transferred to the first server and
24 thereafter to the initial requesting entity (i.e. client). In

1 other embodiments, multiple numbers of servers can make requests
2 of each other, wherein the subsequent server's results can be
3 transferred to a requesting server. In different embodiments,
4 the requesting and executing servers can be configured the same
5 or differently.

6 In the system of Figure 8, the GUI **114** can be implemented as
7 a web page using XML, HTTP, and CGI and Perl scripts, etc., as
8 described herein, wherein such GUI or web page can be viewed
9 using an internet browser. For example, an internet browser can
10 present a web page to an internet user as illustrated by Figure
11 9, wherein a user accessing the GUI web page **120** can be presented
12 with options to Register a Web Site **122**, Modify a Web Site **124**,
13 Access the Knowledge Database for content information or
14 additions **126**, or perform a Search **128**. Referring to Figures 8
15 and 9, the Web Page Registration module **110** can be implemented
16 through the Register Web Site **122** and Modify Web Site **124**
17 options, while the knowledge database module **112** can be accessed
18 and implemented through the Knowledge Base option **126**.

19 Similarly, the Search Engine **114** can be implemented through the
20 use of a Search option **128** that utilizes a keyword textbox input
21 **130** and a selectable option **132** to search by exact matches of the
22 word in the keyword inputs, or occurrences of the keyword inputs.

23 In the illustrated systems, one or more keywords can be entered
24 by a user into the keyword input **130** and connected using

1 relational operators such as "+" to denote logical AND, "-" to
2 denote logical OR, etc. Other logical operands can be used
3 without departing from the scope of the invention, for example,
4 using characters such as AND, OR, etc. Those with ordinary skill
5 in the art will recognize that the invention herein is not
6 limited to the input objects such as textbox objects, selectable
7 buttons, etc., and other processes for entering and/or receiving
8 information can be used without departing from the scope of the
9 invention.

10 The illustrated system allows a user to Register a Web site
11 by providing, for example, a website name identifier, a URL that
12 represents the website, a geographic location, a description of
13 the website, and a password to protect the website-related data
14 that is entered into the Web Organizer **106**. A website registrant
15 can also provide descriptor terms that can further describe or
16 identify the website. For example, a law firm website
17 registering with the Web Organizer **106** may provide descriptors
18 related to areas of practice, such as "Taxation", "Patents",
19 "Criminal", etc. Other websites may includes descriptors
20 relating to the services or products offered by the website.

21 In the illustrated embodiments, after a website is
22 registered, the descriptor information from the registration
23 process is transferred to the URL database **104**. Additionally, a
24 bot, or robot, as commonly known in the art, is executed to

1 retrieve the web pages or URLs associated with and/or related to
2 the registered website/URL, wherein in the illustrated systems,
3 the bot further retrieves, for each related and/or associated URL
4 or page, metadata associated with the pages. The URLs (or page)
5 address and associated metadata can also be incorporated into the
6 URL Database **104**. Those with ordinary skill in the art will
7 recognize that the retrieval of metadata as descriptors by bots
8 is merely illustrative, and other mechanisms for retrieving
9 descriptor information can be implemented without departing from
10 the scope of the invention.

11 For example, Figure 10 illustrates the result of a
12 registration of website www.xyz.com. The Figure 10 memory
13 segment is merely illustrative and not intended for limitation,
14 and includes a sample registration of www.xyz.com wherein five
15 descriptors, D1-D5, were provided by the registrant. The bot
16 process thereafter provided related web pages designated by
17 www.xyz.com/?/? as those with ordinary skill in the art would
18 recognize as the format for related URLs or web pages that are
19 associated with the same Internet Protocol (IP) address as the
20 registered webpage, wherein the associated metadata for the
21 related URLs were also retrieved and placed into the URL Database
22 **104**.

23 Alternately and or additionally, a website registrant can
24 decide at any time to add or delete descriptors for a registered

1 web page by selecting the Modify Web Site option **124** such as that
2 illustrated in Figure 9. Additionally and optionally, a website
3 registrant can also decide at any time after website
4 registration, to provide additional input to the Knowledge
5 Database **102**. For example, if a registrant understands that
6 there is an atypical use of a word in or on its website that is
7 different, the registrant can decide to provide the Knowledge
8 Database **102** with new entries.

9 Referring now to Figure 11, there is shown an illustration
10 of a webpage that can be presented to a user that selects the
11 Knowledge Database option **126**. According to the illustration of
12 Figure 11, the two stage reciprocal memory can be represented by
13 General (i.e., Physical) and Specific (i.e., Conceptual) data. A
14 registrant can utilize a Look-up option **140** to determine the
15 current representation of a word in Knowledge Database **102**. For
16 example, although the word "apple" can be associated with a
17 fruit, the word "apple" can also be associated with a computer
18 manufacturer. Should a meaning of the word not be currently
19 represented as intended or desired by a registrant, the
20 registrant can utilize a textbox or keyword box **142** to enter a
21 word, and thereafter utilize the Add to General **144** or Add to
22 Specific **146** options accordingly to enter, or register, a new
23 definition or association for the word.

1 Referring now to Figure 12A, there is shown an exemplary
2 block diagram indicating a process **150** by which information from
3 a registrant or user can register a website. In the Figure **12A**
4 process **150**, a registrant can visit a webpage **152** such as
5 indicated herein for registering a URL, although those with
6 ordinary skill in the art will recognize that the exchange of
7 information between a registrant and the system is not required
8 to be via a webpage, and URL registration can occur through other
9 data exchange methods including mail-in registration forms,
10 registration information received via telephonic methods, or any
11 other well-known method for communicating data between parties.
12 In accordance with the URL registration process, the registrant
13 can specify descriptors, wherein the URL and the descriptors can
14 be incorporated **154** into the URL Database, for example, in a
15 system as shown in Figure 8 **104**. The webpages associated with
16 the registered URL can be retrieved using a bot **156** and the
17 metadata for the associated pages can also be retrieved. The
18 associated webpages and respective metadata can be incorporated
19 **158** into the URL database and respective counters for descriptive
20 words or terms can be updated accordingly **160**. In the
21 illustrated systems, counters are associated with the URL
22 database descriptive terms to track the number of associations of
23 a given descriptor to URLs. In the illustrated systems, this
24 updating is performed as entries are added to the URL database,

1 although other the counters can be updated at fixed intervals or
2 other times without departing from the scope of the invention.

3 Referring now to FIG. 12B, there is an illustrative block
4 diagram indicating a process **170** to be performed when a user or
5 other visitor to the Web Organizer webpage enters a search
6 term(s) in the keyword entry box **130** (FIG. 9) and selects the
7 Search button **128**. The illustrated systems, upon accepting the
8 search term(s) **172**, creates keyword associations with the search
9 term **174** by extracting information from the Knowledge Database
10 **102** of FIG. 8, otherwise known as the reciprocal two-stage
11 memory. For the illustrated methods and systems, the keyword
12 associations can be derived using any one or more of the
13 previously detailed extraction methods, depending upon the number
14 of search terms specified in the keyword box **130**. For example,
15 if only a single search keyword is presented in the keyword box
16 **130**, extraction algorithms such as reduction and deduction can be
17 implemented to form keyword associations. Alternately, if
18 multiple search terms are presented, keyword associations can be
19 determined using extraction methods of recall, categorization,
20 and reasoning. In some embodiments, a single extraction method
21 can be used for single search word input while another extraction
22 method can be used for multiple search word inputs. In other
23 embodiments, for example, a single search word input can produce
24 keyword associations according to reduction and deduction, while

1 a multiple search word input can cause keyword associations
2 according to recall, categorization, and reasoning. By utilizing
3 the extraction methods provided herein, alone or in combination,
4 the keyword associations provide a dynamic result (keyword
5 associations) for the search word input(s).

6 In an embodiment, the Knowledge Database **102** can include
7 only the descriptor terms defined or otherwise registered by URL
8 registrants. In such an embodiment, the processes of reduction,
9 deduction, recall, categorization, reasoning, etc., may not be
10 used to provide search results.

11 Referring now to FIG. 13, there is shown an exemplary
12 portion of an illustrative Knowledge Database **102**. For example,
13 if the search term is "Apple" and the extraction methods of
14 reduction and deduction are utilized, the keyword associations
15 according to the memory of FIG. 13 include "Fruit", "Computer",
16 and "MAC OS." Alternately, if the search term is "Windows", and
17 deduction is the extraction method, the resulting keyword
18 associations include "House", and "PC".

19 Returning now to FIG. 12B, once the keyword associations are
20 identified **174**, the URL Database **104** can be searched according to
21 the search term(s) and the keyword associations **176** to determine
22 subcategories and cross-categories of the search term. In an
23 embodiment, the keyword associations from the Knowledge Database
24 **102** can be understood to be additional search terms for searching

1 the URL database **104**. For example, if the search term is "ABC"
2 and the keyword associations from the Knowledge Database **102** are
3 "DEF" and "GHI", the URL database search identifies URLs having
4 descriptors of "ABC" or "DEF" or "GHI." In an embodiment, the
5 user whom enters the "ABC" term does not understand that the
6 "DEF" and "GHI" terms are also being included as a logical "OR."

7 As indicated previously, by utilizing the Knowledge Database **102**
8 to develop keyword associations, and providing a mechanism
9 wherein registrants can add non-traditional associations to the
10 database, searches are dynamic and more exhaustive when compared
11 to traditional searching techniques.

12 Returning to the example provided herein as related to FIG.
13 and the illustrated systems, wherein "Apple" is entered by a
14 user as an "exact" search term, and the Knowledge Database **102**
15 produces "Fruit", "Computer", and "Mac OS" as keyword
16 associations, a search through the URL database **104** can be
17 performed to identify URLs having a descriptor, metadata, etc.
18 (herein referred to collectively as a "descriptor") equal to any
19 of "Apple" or "Fruit" or "Computer" or "Mac OS." This set of
20 identified URLs, together with the other descriptors related to
21 the identified URLs, can form a basis for identifying what shall
22 herein be referred to as subcategories and cross-categories.

23 Subcategories of the identified search term can be
24 understood as descriptors associated exclusively with an IP

1 address to which the search term is also associated.

2 Alternately, cross-categories are descriptors associated with an
3 IP address to which the search the term is also associated, but
4 such association is not exclusive to the URLs or IP addresses to
5 which the search term is associated. Cross-categories can also
6 be identified as keyword associations from the Knowledge Database
7 **102** that can be associated with one or more URLs in the URL
8 Database **104**. Keyword associations from the Knowledge Database
9 **102** that are not included in the URL database **104**, in the
10 illustrated systems and methods, are not further utilized.

11 For example, consider a search term entered into a keyword
12 entry box **130** such as shown by FIG. 9, wherein the keyword is
13 entered by a user of the Web or Internet Organizer and
14 represented as D1. As a first example, consider that the
15 Knowledge Database **102** does not provide any keyword associations
16 for D1 (alternately, it could be said that any keyword
17 associations provided by the Knowledge Database **102** did not have
18 any presence in the URL Database **104**). The search term, D1,
19 however, does have an association with URL GROUP A as shown in
20 FIG. 14A, wherein URL GROUP A is further associated with
21 descriptors of D2, D3, D4, D5, D6, and D7. Those with ordinary
22 skill in the art will recognize that URL GROUP A is a group of
23 related URLs that can be understood as a group of URLs having the
24 same IP address. Similarly, the search term, D1, and/or

1 descriptors D2-D7, can be a single or multiple-word term. The
2 search term, D1, and descriptors D2-D7 associated with URL GROUP
3 A can also be associated with a number of occurrences that the
4 search term or descriptor occurs in the URL Database. Such
5 numbers of occurrences are represented in parentheses beside the
6 search term/descriptor as shown in FIG. 14A. For the purposes of
7 illustration, it can be understood that the search term D1 and
8 descriptors D4, D5, and D7 are only associated with URL GROUP A,
9 while D2, D3, and D6 are associated with URL GROUP A and other
10 URLs and/or URL groups. The respective associations can
11 otherwise be viewed by FIG. 14B, wherein descriptors D2 and D3
12 are otherwise associated with URL GROUP B, and descriptor D6 is
13 otherwise associated with URL GROUP B and URL GROUP C. Those
14 with ordinary skill in the art will recognize that other
15 descriptors for URL GROUP B and URL GROUP C can exist, but may
16 not be shown in FIG. 14B. For the example as shown of FIG. 14B,
17 descriptors D4, D5, and D7 are subcategories of search term D1 as
18 such descriptors are associated with only URL GROUP A (i.e., IP
19 address relating to URL GROUP A), while descriptors D2, D3, and
20 D6 are cross-categories of search term D1 because D2, D3, and D6
21 are associated not only with URL GROUP A, but with another URL
22 GROUP(s).

23 FIG. 14C provides a more complex example, wherein the search
24 term, D1, is associated with more than one URL group. In such an

1 example, URL GROUPs are once again represented by circles, with
2 descriptors represented as D1-D11 and respective numbers of URL
3 associations in parenthesis. For the example wherein search term
4 D1 is associated with three URL groups, the descriptors for the
5 three URL groups can be analyzed to determine whether those
6 descriptors are subcategories or cross-categories of the
7 respective URL group. From the example shown in FIG. 14C, D2,
8 D5, D7, and D9 can be subcategories, having exclusive association
9 with URL groups associated with the search term (D1).

10 Alternately, D3, D4, D6, D8, D10, and D11 are cross-categories
11 associated with URL groups that are similarly associated with the
12 D1 search term, but such descriptors also have an association
13 with other URL groups. The numbers of associations that the
14 cross-category maintains with the search term URL and at least
15 one other URL can be presented, while a separation presentation
16 can be provided for the number of associations of the cross-
17 category term with all URLs (i.e., not just the search term URL).

18 In an embodiment, this latter association can be presented as
19 the "whole" cross-category.

20 As indicated previously, keyword associations produced by
21 the Knowledge Database **102** that have associations to URLs in the
22 URL Database **104** can also be known as cross-categories in the
23 illustrated systems and methods.

1 The illustrated systems and methods provide the results of
2 the search to the user with respect to the number of URLs
3 associated to the search term, the names of the subcategory
4 descriptors and the respective number of associations of the
5 subcategory term to the respective URL family, the names of the
6 cross-category descriptors and the respective number of
7 associations of the cross-category term to the search term URLs,
8 and the number of associations between the cross-category
9 descriptor and all URLs (i.e., "whole"). In an embodiment, users
10 can be provided an opportunity to search a subcategory, a part of
11 a cross-category having commonality with the original search
12 term, or the whole cross-category. Those with ordinary skill in
13 the art will recognize that the invention herein is not limited
14 to the information displayed to the user, and that less or more
15 information can be presented to the user in varying formats
16 without departing from the scope of the invention.

17 In one embodiment, search results can be presented by
18 providing URL links to the respective webpages or URLs, wherein
19 the links can be HTTP links. In one embodiment, URL links can be
20 presented twenty per page, with the user able to select "next"
21 and "previous" selections accordingly to view the next twenty
22 links and the previous twenty links, respectively. As indicated
23 previously, users can additionally and optionally be provided
24 with the names of all subcategories and cross-categories, and the

1 users can select to explore a subcategory or cross-category,
2 whereupon the search results can be presented in the same format
3 of total hits, subcategories, cross-categories, etc.

4 Referring now to FIG. 15, there is an illustrative
5 embodiment wherein search results can be presented for a search
6 term of "law". In the FIG. 15 representation, the search results
7 indicate 4,744 URLs related to law **180**, wherein these links can
8 be individual pages of related URLs or URLs within a family of
9 URLs (i.e., single IP address). Subcategories of the search term
10 can be presented as Dynamic Subcategories **182**, and in the
11 illustrated embodiment, the subcategories are listed in order of
12 the most URL associations, with a user able to view or scroll
13 through the list of subcategories using an arrow key **184** that
14 controls a drop-down object. In the illustrated system, the user
15 can explore any dynamic subcategory **182** by selecting the
16 subcategory **182** to display, and depressing the "explore" key **186**
17 that causes a new search to be performed. Returning to FIG. 15
18 wherein the search results for a search term of "law" are
19 provided, dynamic cross-categories **188** can be presented. For the
20 illustrated search wherein "Organization" is an illustrated
21 cross-category, it can be interpreted that 272 URLs have "law"
22 and "organization" as descriptors, while 4004 URLs maintain
23 "organization" as a descriptor. As with the subcategory option,
24 users can further search either the portion of the cross-category

1 overlapping with the search term or the entire cross-category by
2 selecting the "explore cross" **190** or "explore whole" **192** selector
3 options, respectively. Also, cross-categories can be selected
4 using an arrow **194** to access the contents of a drop-down box
5 object to display, scroll, and select a cross-category. Those
6 with ordinary skill in the art will recognize that drop-down
7 objects can be replaced with radio buttons, check-box objects, or
8 other selectable options without departing from the scope of the
9 invention.

10 In the FIG. 15 embodiment, a user also has the option of
11 beginning a new search by entering the search term in a keyword
12 box **196**. Those with ordinary skill in the art will recognize
13 that the information presented in FIG. 15 can be reformatted,
14 expanded, and reduced without departing from the scope of the
15 invention.

16 What has thus been described is a system and method to
17 organize information on the internet for rapid and organized
18 retrieval. Registrants of websites can register URLs by
19 specifying the URL and associated descriptors. A bot
20 automatically determines URLs and metadata associated with the
21 registered URL. The URLs and descriptors and/or metadata form a
22 URL database. Search terms entered by users can be indexed
23 against a knowledge database using one or more retrieval
24 algorithms to provide keyword associations. The knowledge

1 database further includes a knowledge acquisition and retrieval
2 system and method that include at least one first memory segment,
3 and a distinct second memory segment, wherein elements of the at
4 least one first memory segment reciprocally associate to elements
5 of the second memory segment. Registrants can modify the
6 knowledge database to incorporate non-traditional associations.
7 The search term, keyword associations, and URL associations
8 provide an organized search result that includes subcategories
9 and cross-categories of information that can be further searched
10 by the user. URL links can be provided in the search results.

11 Although the present invention has been described relative
12 to a specific embodiment thereof, it is not so limited.
13 Obviously many modifications and variations of the present
14 invention may become apparent in light of the above teachings.
15 It will be understood that although the systems have been
16 described with reference to functional blocks, the systems
17 described herein can be computer programs, such as C language or
18 Java language programs, and that the blocks depicted herein are
19 merely representative of the procedures and functions that can be
20 performed by the program. It will further be understood that the
21 systems can be dedicated hardware devices, or combinations of
22 hardware and software. For example, although the examples
23 provided indicated three reciprocal database associations for
24 each physical-conceptual input pairing, multiple-valued pointers

1 may be implemented to effectuate the three relationships using
2 fewer than three database entries. A database structure is not
3 required, and the system may be built upon different memory
4 segments. Additionally, the physical memory segment may comprise
5 a single memory device with multiple partitions, or multiple
6 memory devices, or combinations thereof. The conceptual memory
7 segment may be similarly structured. Although the system
8 provided for auditory, visual, language, motion, and sensor
9 inputs and outputs, only one or a subset of such input/output
10 devices may be utilized. Similarly, the input and output
11 interfaces for the different input or output modes may be shared,
12 separate, and may require multiple interfaces for a single input
13 or output mode. Although the system was structure as having
14 input, storage/association, retrieval, and output modules, the
15 modules are not required to be structured as such, and
16 functionality may be incorporated otherwise. The preferred
17 embodiment presented seven different retrieval algorithms, but
18 the invention may be practiced with fewer than seven retrieval
19 algorithms. The web organizer graphical user interfaces are
20 provided for illustration and not limitation, wherein any
21 similarly designed interface for exchanging information between
22 the user and methods and systems according to the invention
23 herein can be utilized. Although the web organizer utilized
24 objects such as drop-down boxes to present search results, other

1 mechanisms could be utilized including radio buttons, check
2 boxes, and other well-known input and/or display objects.
3 Although the bot or robot for the illustrated systems and methods
4 herein retrieved and incorporated metadata as descriptors for
5 URLs associated with registered URLs, other embodiments of the
6 invention can incorporate other products of associated URLs as
7 descriptors, including but not limited to descriptors that are
8 retrieved from databases associated with the URLs, keywords
9 associated with the URLs, keywords as a product of text scans of
10 the URLs, etc. The Knowledge Database and URL database, although
11 represented herein as separate databases for illustrative
12 purposes, can be understood to represent a single database having
13 multiple partitions.

14 Many additional changes in the details, materials, steps and
15 arrangement of parts, herein described and illustrated to explain
16 the nature of the invention, may be made by those skilled in the
17 art within the principle and scope of the invention.

18 Accordingly, it will be understood that the invention is not to
19 be limited to the embodiments disclosed herein, may be practiced
20 otherwise than specifically described, and is to be understood
21 from the following claims, that are to be interpreted as broadly
22 as allowed under the law.